REMARKS

This is intended as a full and complete response to the Office Action dated May 29, 2008, having a shortened statutory period for response set to expire on August 29, 2008. Please reconsider the claims pending in the application for reasons discussed below.

Applicants thank the Examiner for reopening the prosecution of the present case.

Claims 5-6, 18, 30 and 35 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over US Patent No. 6,430,105 ("Stephen) in view of US Patent No. 6,353,577 ("Orban") and US Publication No. 20020126575 ("Bittleston").

The Examiner takes the position that column 2, lines 1-58 and column 3, line 60 to column 4, line 63 of Stephen discloses determining at least one initial value of at least one orientation sensor coupled to at least one ocean bottom cable; and determining at least one current value of the at least one orientation sensor. The Examiner further states that Stephen discloses calculating the orientation with the accelerometers in real time, and therefore there are continuous initial and current values of orientation being generated by the accelerometers. The Examiner then concludes that Stephen discloses comparing the initial value of the orientation sensor to the current value of the orientation sensor and provides column 2, lines 1-58; column 3, line 60 to column 4, line 63; and column 5, lines 20-45 as support.

Applicants respectfully traverse this rejection on several fronts. Stephen generally describes the use of ocean bottom cables in seismic surveying. Each ocean bottom cable has sensor units, each sensor unit having three orthogonally disposed accelerometers for measuring acceleration due to gravity and seismic vibration. (See column 4, lines 15-21). Each of the three accelerometers is directed to a vertical axis (the "up" axis), along the axis of sensor unit (the "along" axis) and across the axis of the sensor unit in the horizontal plane (the "across" axis), respectively. Each accelerometer is sensitive only to accelerations applied along a particular axis on which it is disposed. (Column 2, lines 3-18). The seismic signal from the "up" axis accelerometer is transposed to give the seismic signal in the up axis, the seismic signal from the along axis accelerometer is transposed to give the seismic signal in the "along" axis and the

seismic signal from the "across" axis accelerometer is transposed to give the seismic signal in the "across" axis. (Column 3, lines 3-10). More specifically, "[o]nce the orientation of a sensor 1 is so determined, the angle between the vertical 11, and each axis 8, 9, 10 of the sensor 1 is known. This can be used to form a transformation matrix to transpose the measured seismic signals to the reference vertical 11 and horizontal 12 13 axes. Thus the seismic data measured by each accelerometer 5, 6, 7 is transposed so that the sensor 1 gives three seismic signals in the required axes." (Column 4, lines 41-48). **Calculation of the orientation of the sensor and transposition of the seismic signals can be implemented in real time or at the time of processing the seismic data set.** (Column 4, lines 54-56).

The Examiner takes the position that since Stephen discloses calculating the orientation with the accelerometers in real time, there are **continuous** initial and current values of orientation being generated by the accelerometers. Applicants respectfully traverse this interpretation of Stephen. Stephen never mentions measuring the orientation of the accelerometers continuously. This "continuous" generation of initial and current orientation values by the accelerometers is something that is not taught in Stephen. Applicants respectfully believe that this interpretation of Stephen is in error. If Applicants are mistaken, Applicants would very much appreciate the Examiner to show the exact locations in Stephen teaching this limitation.

Further, nothing in Stephen teaches "**comparing** the at least one initial value of the DC signal of the at least one orientation sensor to the at least one current value of the DC signal of the at least one orientation sensor." (Emphasis added). In contrast, Stephen merely proposes that calculation of the orientation of the sensor and transposition of the seismic signals can be implemented in real time or at the time of processing the seismic data set. (Column 4, lines 54-56). No where in Stephen does it state that these calculated orientations are (1) compared and then (2) used to determine whether the ocean bottom cable has moved based on the comparison. Since Stephen is not concerned about determining whether the ocean bottom cable has moved based on the comparison of the orientations of the sensors, Stephen is silent regarding this issue.

The Examiner admits that Stephen does not specifically disclose determining whether or not the at least one ocean bottom cable has moved based on the comparison. However, the Examiner states, without any support, that since the orientation signals generated by the accelerometers are processed in real time, a change in the orientation would be shown in real time. The Examiner then attempts to supplement this missing limitation with Bittleston.

Bittleston is generally directed to a control device or "bird" for controlling the position of a marine seismic streamer. The bird has an inclinometer that determines the roll angle of the bird. "In operation, the control circuit 34 receives between its inputs 35 and 36 a signal indicative of the difference between the actual and desired depths of the bird 10, and receives between its inputs 37 and 38 a signal indicative of the difference between the actual and desired lateral positions of the bird 10. These two difference signals are used by the control circuit 34 to calculate the roll angle of the bird 10 and the respective angular positions of the wings 24 which together will produce the necessary combination of vertical force (upwardly or downwardly) and lateral force (left or right) required to move the bird 10 to the desired depth and lateral position. The control circuit 34 then adjusts each of the wings 24 independently by means of the stepper motors 48, 50, so as to start to achieve the calculated bird roll angle and wing angular positions." (Bittleston, paragraph 0025).

Like Stephen, Bittleston also fails to teach or disclose "comparing the at least one initial value of the DC signal of the at least one orientation sensor to the at least one current value of the DC signal of the at least one orientation sensor" and "determining whether the at least one ocean bottom cable has moved based on the comparison." In contrast, Bittleston merely proposes a bird having an inclinometer that determines the roll angle of the bird. Bittleston mentions nothing about measuring orientation of sensors on an ocean bottom cable, let alone comparing the orientation measurements and determining whether the ocean bottom cable has moved based on the comparisons.

Further, if the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims prima facie obvious. MPEP

2143.01; *In re Ratti*, 270 F.2d 810 (CCPA 1959). Here, Bittleston is about birds for controlling the position or "steering" streamers, which are continuously towed and moving. On other hand, Stephen is about ocean bottom cables which stay at the bottom of the ocean and cannot be moved. To place "birds" on ocean bottom cables to control movement of the ocean bottom cables would require a significant change in the seismic surveying operation disclosed in Stephen, since the ocean bottom cables are designed to stay in one place at the bottom of the ocean. As such, the Examiner's suggested combination of Stephen and Bittleston would require a substantial reconstruction and redesign of the elements shown in Stephen as well as a change in the basis principle under which the Stephen construction was designed to operate.

The Examiner also admits that Stephen does not teach or disclose that the values of the orientation sensors are DC signal and what type of signal is generated by the accelerometers that determine the orientation. The Examiner then supplements this missing limitation with Orban. However, like Stephen and Bittleston, Orban also does not teach or disclose "comparing the at least one initial value of the DC signal of the at least one orientation sensor to the at least one current value of the DC signal of the at least one orientation sensor" and "determining whether the at least one ocean bottom cable has moved based on the comparison."

Further, if the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims prima facie obvious. MPEP 2143.01; *In re Ratti*, 270 F.2d 810 (CCPA 1959). Here, the Examiner's proposed modification of placing the sensor units disclosed in Orban inside the ocean bottom cables disclosed in Stephen would significantly change the seismic surveying operation disclosed in Orban. As mentioned above, the sensor units in Orban require to be planted into ground, while the ocean bottom cables in Stephen are not planted into ground but are laid on the ground and are thereby subject to movements caused by currents and/or turbulence in the water. Placing the sensor units taught in Orban inside the ocean bottom cables taught in Stephen would prevent the sensor units taught in Orban from being planted into the ground, resulting in insufficient acoustic and mechanical contact with the ground. As such, the Examiner's suggested combination of

Stephen and Orban would require a substantial reconstruction and redesign of the elements shown in Orban as well as a change in the basis principle under which the Orban construction was designed to operate.

Since neither Stephen, nor Bittleston, nor Orban, alone or in combination, teaches all the limitations of claims 5, 18, 30 and 35, claims 5, 18, 30 and 35 are patentable over those references. Claim 6 is also patentable over Stephen, Bittleston and Orban since it depends from claim 5.

Claim 25 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Stephen, Bittleston and ADXL202E ("ADXL202E"). The Examiner admits that Stephen does not disclose a specific type of accelerometer. The Examiner takes the position that Stephen discloses that the accelerometers can be piezoelectric, piezoresistive or capacitive accelerometers. The Examiner attempts to supplement this missing limitation with ADXL202E.

However, Stephen does not teach or disclose "determining whether the at least one ocean bottom cable has moved using the at least one initial inclination and the at least one current inclination." ADXL202E also does not teach or disclose "determining whether the at least one ocean bottom cable has moved using the at least one initial inclination and the at least one current inclination." Neither Stephen nor ADXL202E, alone or in combination, teaches or discloses "determining whether the at least one ocean bottom cable has moved using the at least one initial inclination and the at least one current inclination," as recited in claim 25. Accordingly, claim 25 is patentable over Stephen and ADXL202E.

Claims 5-6, 18, 30 and 35 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Stephen in view of Orban and US Patent No. 6229102 ("Sato"). The Examiner takes the position that Stephen does not specifically state that a step of determining whether or not the at least one ocean bottom cable has moved based on the comparison made, but since the orientation signals generated by the accelerometers are processed in real time, a change in the orientation would be shown in real time. The Examiner attempts to supplement this missing limitation with Sato.

However, as mentioned above, Stephen and Orban, alone or in combination, does not teach or disclose "comparing the at least one initial value of the DC signal of

the at least one orientation sensor to the at least one current value of the DC signal of the at least one orientation sensor" and "determining whether the at least one ocean bottom cable has moved based on the comparison." Sato also fails to teach "comparing the at least one initial value of the DC signal of the at least one orientation sensor to the at least one current value of the DC signal of the at least one orientation sensor" and "determining whether the at least one ocean bottom cable has moved based on the comparison." Neither Stephen, nor Orban nor Sato, alone or in combination, teaches all the limitations recited in claims 5, 18, 30 and 35. Accordingly, claims 5, 18, 30 and 35 are patentable over Stephen in view of Orban and Sato. Claim 6 is also patentable over Stephen, Orban and Sato since it depends from claim 5.

Claim 25 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Stephen, Sato and ADXL202E. As mentioned above, both Stephen and ADXL202E do not teach or disclose "determining whether the at least one ocean bottom cable has moved using the at least one initial inclination and the at least one current inclination." Likewise, Sato does not teach or disclose "determining whether the at least one ocean bottom cable has moved using the at least one initial inclination and the at least one current inclination." Neither Stephen, nor ADXL202E nor Sato, alone or in combination, teaches or discloses all the limitations recited in claim 25. Accordingly, claim 25 is patentable over Stephen, ADXL202E and Sato.

In conclusion, the references cited by the Examiner, neither alone nor in combination, teach, show, or suggest the claimed invention. Having addressed all issues set out in the office action, Applicants respectfully submit that the claims are in condition for allowance and respectfully request that the claims be allowed.

The prior art made of record is noted. However, it is believed that the secondary references are no more pertinent to the Applicants' disclosure than the primary references cited in the office action. Therefore, it is believed that a detailed discussion of the secondary references is not deemed necessary for a full and complete response to this office action. Accordingly, allowance of the claims is respectfully requested.

Respectfully submitted,

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